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Task 0715: Army Chesapeake Bay Total Maximum Daily Load Pilots

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Presentation Outline

➤ **Background**

- Chesapeake Bay Watershed
- Regulatory Drivers
- Upcoming Regulatory Deadlines
- Project Genesis

➤ **Army TMDL Pilot Overview, Technical Components, Path Forward**

- Facilities TMDL Gap Analysis (Complete)
 - Approach, Activities Completed, and Findings
- TMDL Baseline Assessment (Complete)
 - Approach, Activities Completed, and Findings
- Watershed Implementation Plan Model & TMDL Monitoring Strategy (Ongoing)
- Guidebook and Training Development/Delivery (Future)

➤ **Discussion**

Introduction to the Chesapeake Bay Watershed



Source: U.S. Fish & Wildlife Service, Restoring the Chesapeake Bay Watershed website, dated January 2011.

- The Chesapeake Bay Watershed is approximately 64,000 square miles in area.
- The following jurisdictions are partially or entirely located in the Chesapeake Bay Watershed:
 - District of Columbia (DC)
 - Maryland (MD)
 - Virginia (VA)
 - West Virginia (WV)
 - Pennsylvania (PA)
 - Delaware (DE)
 - New York (NY)

Chesapeake Bay TMDL Background

- **Executive Order 13508** - Chesapeake Bay Protection and Restoration (12 May 2009)
 - U.S. EPA committed to establishing a strict “pollution diet” to restore the Chesapeake Bay and its network of local rivers and streams.

- **Total Maximum Daily Load (TMDL)** - Maximum amount of pollution a water body can receive per day and still meet water quality standards designed to ensure waterways are safe, swimmable, and fishable.
 - **Clean Water Act** - Requires that a TMDL be written for all segments of a waterway that fail to meet water quality standards.
 - Most of the Chesapeake Bay and its tidal waters do not meet water quality standards and are listed as impaired (Executive Summary, Draft Chesapeake Bay TMDL, 24 September 2010).

 - **Final Chesapeake Bay TMDL for nitrogen, phosphorus, and sediment** – Released by EPA on December 29, 2010.

Chesapeake Bay TMDL Upcoming Deadlines

- **Watershed Implementation Plans (WIPs)** - EPA is working with VA, MD, PA, NY, DE, WV, and DC to develop Watershed Implementation Plans (WIPs) and an overall TMDL implementation framework.
 - The **Phase I WIPs** were submitted by each state and DC to EPA in November and December 2010, which document the states' TMDL implementation plan and framework.
 - The **Phase II WIPs** will indicate how the states and DC plan to achieve their share of the pollution diet by further delineating and allocating pollution reduction targets and by proposing actions to achieve the reductions.
 - The current **Phase II WIP** deadlines include:
 - Draft Phase II WIPs due to EPA in June 2011.
 - Final Phase II WIPs due to EPA in November 2011.

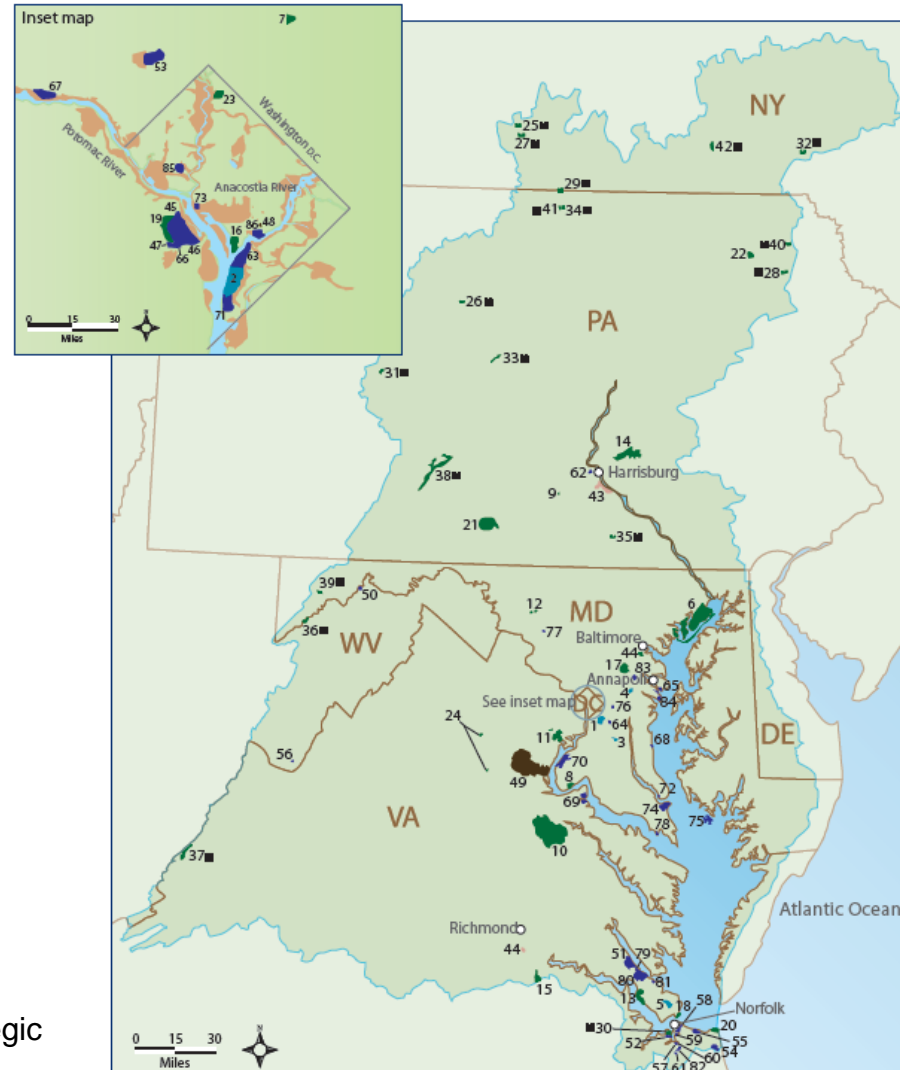
Army Chesapeake Bay TMDL Pilots Task Objective

- In response to TMDL development, Army facilities will need to:
 - Work with the regulatory community to establish their individual nutrient and sediment load allocations.
 - Be prepared to provide information regarding existing and proposed storm water pollution control practices and procedures to the regulatory community during the development of Watershed Implementation Plans.
- **The purpose of this task** is to:
 - ***Build a model*** in the form of a roadmap for Army facilities to use in developing the documentation that will be required under the future Chesapeake Bay TMDL Program.
 - Provide that model as ***a transferable process and guidance document*** that uses Geographic Information Systems (GIS) to compile land cover data in coordination with current EPA TMDL modeling and a prioritization of storm water pollution control practices for Army point and non-point sources.

DoD Installations in the Chesapeake Bay Watershed

➤ Army Facilities included in pilot:

- Aberdeen Proving Ground, MD (6)
- Fort A.P. Hill, VA (10)
- Fort Belvoir, VA (11)
- Fort Detrick, MD (12)
- Fort Indiantown Gap Army National Guard (ARNG), PA (14)
- Fort Meade, MD (17)
- Letterkenny Army Depot, PA (21)
- Scranton Army Ammunition Plant, PA (22)



Source for Figure: Department of Defense Chesapeake Bay Strategic Action Plan, 7 November 2008.

Approach: Technical Components

1. Facilities TMDL Gap Analysis
2. TMDL Baseline Assessment
3. Watershed Implementation Plan Model and TMDL Monitoring Strategy
4. Guidebook and Training Development/Delivery

1) Facilities TMDL Gap Analysis (COMPLETE)

- Collected *existing* GIS data and information on point and nonpoint sources, storm water quality, and storm water management.
- Evaluated *applicability of TMDL* to the Army facilities.
- *Identified data gaps* and information needed to prepare a TMDL baseline and provided recommendations for closing gaps at each facility.
- *Prioritized Army facilities* to move forward under this Task.

Document Types	Requested Document	Document Titles and Dates	Obtained Copy?
Facility Maps	GIS data for General Base Map with Building Names/Numbers		
	GIS data for Storm Water Infrastructure, Outfalls, Storm Water Basins, land-use data, topography, hydrology		
Aerial Photography	Available aerial photographs of the base		
Permits	NPDES Permit(s) for Storm Water Discharges from WWTPs		
	NPDES Permit(s) for Industrial Storm Water Discharges		
	NPDES Permit(s) for Construction Activities		
	NPDES MS4 Permit		
Monitoring Activities	Discharge Monitoring Reports Associated with NPDES Permits		
Reports, Plans, and Assessments	Storm Water Pollution Prevention Plan		
	Facility Master Plan		
	Nutrient Management Plan		
	Integrated Natural Resource Management Plan		
	Stormwater Management and Erosion and Sediment Control Plans		
	Storm Water Management Plans		
	Stream/Wetlands Assessment Reports		

Snapshot of Data Collection Tool used during TMDL Gap Analysis Site Visits.

Findings: Facilities TMDL Gap Analysis

- The Chesapeake Bay TMDL is considered applicable to all eight Army facilities.

Facility	Number of Activities Relevant to TMDL	Number of Data Gaps
Fort A.P. Hill, VA	17	15
Aberdeen Proving Ground, MD	16	17
Fort Indiantown Gap ARNG, PA	15	11
Fort Detrick, MD	12	28
Fort Belvoir, VA	12	18
Fort Meade, MD	11	19
Letterkenny Army Depot, PA	11	10
Scranton Army Ammunition Plant, PA	3	4

Common Activities Applicable to the TMDL

- Most common activities applicable to the TMDL (occurring at 6-8 Army facilities surveyed):
 - Semi-permanent stockpiles of soils and sands;
 - Air emissions with deposition potential;
 - Construction projects;
 - Existence of septic systems/sewage holding tanks;
 - Fertilizer applications;
 - Wastewater treatment plants; and
 - Urban storm water runoff.

Conclusions from Component 1. Facilities TMDL Gap Analysis

- Based on findings and Army Headquarters and Command feedback, the following 5 Army facilities were prioritized to receive upcoming activities under this Task:
 - Fort Detrick, MD
 - Fort Indiantown Gap ARNG, PA
 - Letterkenny Army Depot, PA
 - Scranton Army Ammunition Plant, PA
 - Fort A.P. Hill, VA

- The following facilities are anticipated to receive Installation Management Command-Northeast funds to conduct similar TMDL Assessments and will therefore not receive additional activities under this Task:
 - Aberdeen Proving Ground, MD
 - Fort Belvoir, VA
 - Fort Meade, MD

2) TMDL Baseline Assessment (COMPLETE)

- Assess 5 Army facilities to *evaluate point and nonpoint sources* (in the form of land use) that have the potential to contribute high sediment and/or nutrient loads to the Chesapeake Bay.
- *Baseline nitrogen, phosphorus, and sediment loads* to the Chesapeake Bay were calculated for each facility to use for best management practice (BMP) implementation planning using:
 - Nutrient and sediment loading rates already developed by the Phase 5.3 Chesapeake Bay Watershed Model for various land uses,
 - Existing local and facility GIS data, and
 - Point and nonpoint source data gathered from the facilities.

Point Sources and Nonpoint Sources Evaluated

- Point Sources:
 - Wastewater treatment plants
 - Septic systems
 - Fish nursery (in one case)
- Nonpoint Sources in the form of the following land uses:
 - Impervious urban
 - Pervious urban
 - Construction
 - Extractive
 - Agricultural (various)
 - Forest
 - Harvested Forest
 - Water

Baseline Assessment Modeling Efforts

- Two *model scenarios* were evaluated using a spreadsheet model, both using Phase 5.3 nitrogen, phosphorus, and sediment loading rates (pounds/year) for various land uses (nonpoint sources). Point sources typically remained the same for both model runs:
 - **Phase 5.3 Model Run:**
 - Incorporated land use acreage received from EPA Phase 5.3 Model outputs for each facility to calculate nitrogen, phosphorus, and sediment loads.
 - Phase 5.3 Model land use acreage data are accurate on only a broad scale.
 - **Facility Land Use Model Run:**
 - Incorporated land use acreage collected from facility site visits to calculate nitrogen, phosphorus, and sediment loads.
 - Facility Land Use Model land use acreage data are accurate on a finer scale than the Phase 5.3 Model land use acreage data.

Findings: TMDL Baseline Assessment Loads

Facility	Approximate Facility Acres	Phase 5.3 Model Run Results			Facility Land Use Model Run Results		
		TN (lb/yr)	TP (lb/yr)	TSS (lb/yr)	TN (lb/yr)	TP (lb/yr)	TSS (lb/yr)
Fort Detrick, MD	1,200	33,510	1,758	499,312	34,630	2,044	867,170
Forest Glen, MD	170	548	39	88,274	576	66	178,744
Glen Haven, MD	19	Facility Land Use Data not available from Phase 5.3 Model			163	42	10,363
Fort A. P. Hill, VA	74,600	115,545	12,070	1,898,236	164,566	14,676	1,903,729
Letterkenny Army Depot, PA	17,700	115,476	8,321	4,512,339	105,693	6,100	5,082,421
Fort Indiantown Gap ARNG, PA	17,700	162,932	1,335	2,420,795	171,494	2,869	2,271,837
Scranton Army Ammunition Plant, PA	15	118	8	2,703	114	18	9,383

Note: Lower values for nitrogen, phosphorus, and sediment loads between the two model runs are in bold text.

Findings: TMDL Baseline Assessment Sources

➤ Point Sources:

- Facilities with 1,000+ acres had wastewater treatment plants (WWTPs). Often, these plants contributed significantly to the loads, with the smaller facilities seeing proportionately higher contributions from their plants than the larger facilities.
- Contributions from other point sources were minor in comparison to WWTPs and nonpoint sources.

➤ Nonpoint Sources:

- Differences between Model Runs were typically due to the different proportions of various nonpoint sources (land uses) at the facilities.
- Impervious urban, pervious urban, and forest land uses were the three most common land uses at the facilities.
- Agricultural and construction activities typically had the highest loading rates (or highest loads per acre).

Conclusions from Component 2. TMDL Baseline Assessment

- Overall, most facilities would benefit from the lower Phase 5.3 Model Run load results (equivalent to those anticipated from the regulatory community) when compared to the Facility Land Use Model Run results.
- Target allocations were not available from the regulatory community to compare to baseline loads.
- According to discussions with the regulatory community, TMDL compliance will be evaluated based on status of BMP implementation; therefore:
 - Water quality sampling did not play a big role in this evaluation.
 - Quantitative assessment of storm water runoff from neighboring facilities to federal facilities did not play a role in this evaluation.

3) Watershed Implementation Plan Model and TMDL Monitoring Strategy (Ongoing)

- Evaluate and document opportunities to improve storm water control practices (BMPs).
- Develop a Watershed Implementation Plan (WIP) Model that:
 - Provides example documentation consistent with anticipated needs of State Phase II WIPs.
 - Includes information on existing storm water control practices and planned implementation of future practices (BMPs).
- Develop a TMDL Monitoring Strategy that will document recommended procedures for monitoring and tracking storm water pollution control practice implementation, which may be required by the regulatory community to assess TMDL compliance.

4) Guidebook and Training Development/Delivery (Future)

➤ **Guidebook**

- Capture lessons learned from implementation of this task.
- Document the sequential actions necessary for Army facilities to plan for TMDL compliance.

➤ **Training Development/Delivery**

- Conducted for various Army facilities in the Bay Watershed.

- The process, procedures, and tools used and developed during this NDCEE pilot will be ***transferred*** to the Army during this component, thus enabling the Army to implement a program to assist them in complying with the Chesapeake Bay TMDL.

Path Forward

- **TMDL Baseline Assessments** (DEC 2010 – MAR 2011)
 - Conduct TMDL Baseline Assessment site visits and modeling.
 - Submit Draft TMDL Baseline Assessments .

- **WIP Model & TMDL Monitoring Strategy** (MAR – MAY 2011)
 - Evaluate existing and proposed storm water pollution control practices and prioritize proposed practices.
 - Submit Draft Watershed Implementation Plan Models and TMDL Monitoring Strategies.

- **Guidebook & Training Development/Delivery** (MAY–SEP 2011)
 - Submit Guidebook.
 - Develop and Deliver Training.



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